RESURRECTION OF GREENOIDEA MacGILLIVRAY AND DESCRIPTION OF THE RELATED AVIDOVASPIS, NEW GENUS (HOMOPTERA: DIASPIDIDAE)[1]

Uri Gerson
The Hebrew University of Jerusalem, Faculty of Agriculture, Rehovot, Israel

and

John A. Davidson
Department of Entomology, University of Maryland, College Park, Maryland 20742

ABSTRACT—The generic name *Greenoidea* MacGillivray is resurrected to accommodate its type species, *G. phyllanthi* (Green). This species is redescribed following an examination of original material, from which a lectotype is designated. The closely-related new genus **Avidovaspis** Gerson and Davidson is described along with its type species, *A.* **phoenicis** Gerson and Davidson. The type species of the two genera are figured and compared with *Melanaspis* Cockerell, *Crenulaspidiotus* MacGillivray and *Pseudomelanaspis* Borchsenius in the aspidiotine subtribe Melanaspidina.

The current status of the genus *Crenulaspidiotus* MacGillivray was discussed by Davidson (1970). This genus, reduced by Ferris (1941) to a synonym of *Melanaspis* Cockerell, was resurrected by Borschenius (1966) to accommodate one old world and three new world species. A fifth member of this genus, *C. mini* Davidson, from Arizona, was described by Davidson (1970), who accepted the validity of *Crenulaspidiotus.*

Slides of the old world species, *C. phyllanthi* (Green), were recently examined while studying a related palm-infesting diaspidid from the Sinai Peninsula. A comparison of the two species showed that neither could be placed in *Melanaspis* or in *Crenulaspidiotus.* Nor could they be referred to another closely-related genus, *Pseudomelanaspis* Borchsenius, whose status was clarified by Borschsenius and Williams (1963). To accommodate *phyllanthi* we propose to resurrect the generic name *Greenoidea* MacGillivray. For the other species we propose a new generic name.

Greenoidea MacGillivray

Greenoidea MacGillivray, 1921, The Coccidae: 392.

Diaspidid scale insect referable to the subfamily Aspidiotinae, tribe Aspidiotini, subtribe Melanaspidina. Body of female round; pygidium broad, with 4 pairs of

[1] Scientific Article No. A1831, Contribution No. 4733 of the Maryland Agricultural Experiment Station, Department of Entomology. This study has been supported in part by The Fauna Palaestina Committee of The Israel Academy of Sciences and Humanities.

lobes whose axes are parallel, each interlobular space with a single paraphysis which arises from and is contiguous with the mesal margin of each associated lobe; plates present between all pygidial lobes, parallel sided, rather delicate; fifth abdominal segment devoid of marginal ducts with associated plates.

Type species: *Aspidiotus phyllanthi* Green, by original designation.

Remarks: *Greenoidea* differs from *Pseudomelanaspis* by having pygidial lobes with parallel axes; from *Crenulaspidiotus* by lacking the small transverse furrow above the second pygidial lobes (see Davidson, 1970, for an illustration of this feature); and from *Melanaspis* by possessing a reduced number of lobe-associated pygidial paraphyses, all arising from the mesal margins of the lobes. Thus *Greenoidea* is best defined by lacking characters which the 3 related genera possess.

Greenoidea phyllanthi (Green)

Fig. 1–3

Aspidiotus (*Targionia*) *phyllanthi* Green, 1905, J. Bombay Nat. Hist. Soc. 16:344.

Targionia phyllanthi (Green), Sanders, 1906, USDA Bur. Entomol., Tech. Ser. 12:16.

Greenoidea phyllanthi (Green), MacGillivray, 1921, The Coccidae: 446.

Melanaspis phyllanthi (Green), Ferris, 1941, Atlas Scale Insects N. America, S-III: 347.

Crenulaspidiotus phyllanthi (Green), Borchsenius, 1966, Catalogue Armoured Scale Insects of the World, 359.

Lectotype adult female (fig. 1): Dimensions of body as mounted approximately 0.8 × 0.7 mm. Derm membranous except for pygidium. Each antenna with a single seta. Eyespots not differentiated. Spiracles typical for the family. Ventral prepygidial microducts numerous, disposed as follows: 1 band extending anterolaterally from mouthparts to margin, on each side; 1 band traversing body immediately posterior to mouthparts; 1 cluster immediately anterior to mouthparts; marginal to submarginal rows around body margin, tending to be in clusters on prepygidial abdominal segments, as figured. Dorsal microducts mainly on prosoma, tending to be clustered anteriorly, as figured. One interrupted dorsal apophysis located on abdominal segment 4.

Pygidium broad (fig. 2), about twice as wide as long, with posterior margin almost truncate in outline, and with 5 dorsal sclerotized areas as figured. Perivulvar pores lacking. Anus located in posterior ⅓ of pygidium. Vulva situated in anterior half of pygidium. Pygidial fringe (fig. 3) with 4 pairs of typical lobes, median pair narrowest. Lobes 1 and 2 once-notched on median and lateral aspects. Lobes 3 and 4 once-notched on median aspects and with lateral margins serrulated. Plates obscure, nonfimbriate, shorter than lobes, each bearing 1 gland duct and 1 apical pore, disposed as follows: 2 between first lobes, 2 between lobes 1 and 2, 3 between lobes 2 and 3, and 3 between lobes 3 and 4, on each side. Plates absent anterior to lobe 4. About 20 dorsal macroducts on each side of pygidium with dermal orifices located mostly along pygidial margin and median aspects of sclerotized areas, as figured. One paraphysis arises from center of each median lobe while lobes 2, 3 and 4 have 1 mesally arising paraphysis. Median lobe paraphyses

Fig. 1–3, *Greenoidea phyllanthi*. 1, adult female lectotype, dorsal and ventral aspects. 2, enlargement of dorsal and ventral aspects of pygidium. 3, detailed enlargement of dorsal aspect of pygidial margin.

shortest, those remaining all about equal in length. Dorsal setae associated with median lobes minute, dorsal setae associated with remaining lobes about 3 times larger than median pair and nearly equal to each other in size, and situated on bases of lobes.

Habit: According to Green (1905) the circular female cover is moderately convex, black, with the first instar exuviae white. The male cover is reportedly grayish with a shining dark brown second instar exuviae containing a central, raised, white, first instar exuviae. The females occur on stems and twigs, generally concealed beneath the outer layers of the bark. Males occur on both surfaces of the leaves.

Type data: Adult female lectotype the right hand specimen on a slide with 2 specimens bearing a label on the left which reads "8959— *Aspidiotus phyllanthi* Green n.s. *Phyllanthus myrtifolius* Peradenija Ceylon E. E. Green Coll. June 1900." Three adult females on 2 slides with identical data are here designated paralectotypes. These slides are in the Coccoidea collection of the U. S. National Museum of Natural History, Washington, D. C.

Avidovaspis Gerson and Davidson, new genus

Diaspidid scale insect referable to the subfamily Aspidiotinae, tribe Aspidiotini, subtribe Melanaspidina. Body of female round; pygidium almost truncate, with 3 pairs of lobes whose axes are parallel; each interlobular space with a single paraphysis, those on lobes 2 and 3 arising from and contiguous with mesal margin of each associated lobe, those associated with median lobes not distinctly contiguous with their lobes; fimbriate plates present between all pygidial lobes and forward to segment V where they occur intermittently with marginal ducts.

Type species: *Avidovaspis phoenicis* new species, by present designation.

Remarks: *Avidovaspis* appears to be quite close to *Greenoidea*, and the characters serving to distinguish the latter from related genera, such as *Melanaspis*, *Crenulaspidiotus* and *Pseudomelanaspis* will do for *Avidovaspis* also. These characters, together with the series of intermittent marginal ducts and plates on segment V, and the unique median paraphyses, separate *Avidovaspis* from all other genera in the subtribe Melanaspidina.

This genus is named in honor of Dr. Z. Avidov, Professor Emeritus of the Hebrew University of Jerusalem.

Avidovaspis phoenicis Gerson and Davidson, new species

Fig. 4–8

Holotype adult female: Dimensions of body as mounted (fig. 4) approximately 0.7 mm long × 0.6 mm wide. Derm membranous except for pygidium. Each antenna with a single seta. Eyespots not differentiated. Ventral submarginal microducts present on metathorax and on abdominal segments 1–4. Two uninterrupted dorsal apophyses on abdominal segment 3 and 4.

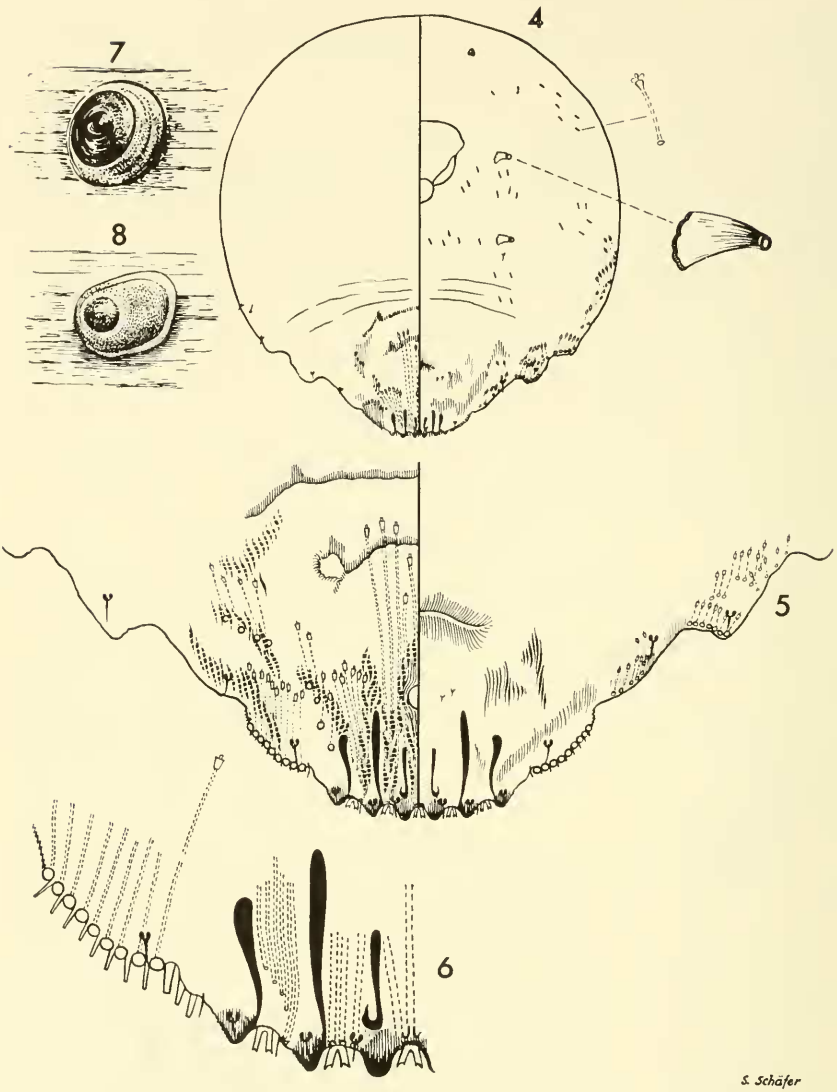

Fig. 4–8, *Avidovaspis phoenicis*. 4, adult female holotype, dorsal and ventral aspects. 5, enlargement of dorsal and ventral aspects of pygidium. 6, detailed enlargement of dorsal aspect of pygidial margin. 7, adult female cover. 8, immature male cover.

Pygidium broad (fig. 5), nearly twice as wide as long, its posterior margin with an almost truncate outline. Dorsal sclerotized areas as in fig. 5. Perivulvar pores lacking. Anus located about midway between vulva and median lobes. Vulva situated near midpygidium. Pygidial fringe (fig. 6) with 3 pairs of well-developed

lobes, median pair a little larger than others, rounded, symmetrical. Second and third pairs of lobes similar to medians but their outer margins weakly serrulated. Pygidial plates delicate, obscure, subequal to lobes in length and with vague fimbriations. Some plates bear apical pores leading into narrow macroducts (i.e., "glanduliferous plates" of Takagi, 1969). Two plates located between each pair of lobes, and about 10 plates outside third pair (mostly on the fifth abdominal segment), between marginal apertures of dorsal macroducts. Three broad macroducts arise between median lobes. Six dorsal broad macroducts (3 on either side of anus) with dermal orifices between median and second pair of lobes, these ducts the longest on pygidium. About 5–7 dorsal narrow macroducts in area between second and third lobes on each side, and approximately 9–13 similar ducts, located on fifth segment on each side, ending in marginal apertures. About 4–5 submarginal dorsal macroducts on segments 4 and 5 on each side. Four posterior pygidial segments apparently devoid of ventral gland ducts. Paraphyses arise from mesal margins of the second and third lobes, 1 paraphysis to each lobe. Second-lobe paraphyses longest, reaching almost to level of anus, parallel-sided except for narrower base. Paraphyses on third lobes wedge-shaped, wider at inner end. An obscure sclerotized area lies above each median lobe, this obscure area meeting hook-shaped paraphysis which is situated above each lobe. Median paraphyses appear to be somewhat different in form and structure from the other paraphyses. Dorsal setae of median lobes arise laterad to lobes, dorsal setae of second and third pair of lobes situated on lobes proper, and of about the same length (fig. 6).

Habit: Male and female scales occur in large numbers on both sides of palm date (*Phoenix dactylifera*) pinnae, where they settle along the veins. Scale cover of adult female circular (fig. 7), approximately 0.85–0.95 mm in diameter, convex, subcentral exuviae shiny black, surrounded by a grayish fluffy film. Scale cover of male prepupa and pupa (fig. 8) elongate, about 0.90 mm in length and 0.75 mm in width, exuviae subterminal, dark-brown, rest of shield brownish.

Remarks: A few females examined contained coiled mouth parts, suggesting that they were young females which had not yet fed, however they contained fully developed embryos. No explanation can be offered for this observation, especially since numerous male shields occurred alongside female scales.

Type data: All type material was collected by Dr. Y. Ben-Dov on July 17, 1968, on pinnae of palm dates, Wadi Feiran, Sinai Peninsula. Holotype female in the coccid collection of the Department of Entomology, Faculty of Agriculture, Rehovot, Israel. Paratypes are deposited in the following collections: British Museum (Natural History), London; U.S. National Museum of Natural History, Washington, D.C.; Department of Entomology, University of Maryland, College Park, Maryland; Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, Virginia; Division of Entomology, Georgia Experiment Station, Experiment, Georgia; Department of Entomology, University of California, Davis, California; Florida State

Collection of Arthropods, Gainesville, Florida; California State Department of Agriculture, Sacramento, California.

Acknowledgments

The authors thank Douglass R. Miller, Systematic Entomology Laboratory, ARS, USDA, and Sueo Nakahara, PP&Q, APHIS, USDA, for their review of this paper.

References

Borchsenius, N. S. 1966. A catalogue of the armoured scale insects (Diaspidoidea) of the world. Akad. Nauk, SSSR, Moscow, 449 p. [in Russian].

———— and D. J. Williams. 1963. A study of the types of some little-known genera of Diaspididae with descriptions of new genera (Hemiptera: Coccoidea). Bull. Brit. Mus. (Nat. Hist.) Entomol. 13:353–394.

Davidson, J. A. 1970. A new *Crenulaspidiotus* from Arizona (Homoptera: Diaspididae). Proc. Entomol. Soc. Washington 72:500–503.

Ferris, G. F. 1941. Atlas of the Scale Insects of North America, Series III, Stanford University Press, Stanford.

Green, E. E. 1905. Jour. Bombay Nat. Hist. Soc. 16:344.

Takagi, S. 1969. Diaspididae of Taiwan, based on material collected in connection with the Japan–U. S. Co-operative Science Programme, 1965 (Homoptera: Coccoidea). Part I. Insecta Matsumurana 32:1–110.